Lefty-Righty Experiment

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CONCEPTS: Algebra, Data Analysis, Mathematical Reasoning
SKILLS: Collecting data, displaying data in words, tables, and graphs, analyzing displayed data, interpreting results
MATHEMATICS STANDARDS: Gr 6: AF 1.0, 1.2; Gr 7: AF 1.1, 1.5, 3.0, 3.3, 3.4, MR 1.0, 1.1, 2.0, 2.6, SDAP 1.0, 1.2; AlgI 6.0
STANDARDS FOR MATHEMATICAL PRACTICE: 1, 2, 3, 4, 5
GRADES: 7–12
MATERIALS: Timer, Student Activity Sheets (pg 39–41)

BACKGROUND

Many of our high school students are struggling to complete secondary school mathematics literacy requirements and high school exit exams. They need experience in representing mathematical ideas visually, numerically, symbolically, and verbally (the fourfold way), giving them multiple ways to communicate their mathematical knowledge. They need simplified verbal instructions, supplemented with written and/or visual clues. Instructions given both verbally and in written form address the needs of students who may have difficulties with auditory discrimination (since they will also be able to see the assignment in writing), who have weaknesses visually (since they may have relative auditory strengths), and who have difficulty with organizational issues (since they are reminded in two different ways).

This activity is just one of a series of lessons developed by mathematicians and experienced middle school teachers. Additional activities and units designed by these authors can be found at **www.mathandteaching.org**.

DESCRIPTION

In this activity the students begin with a concrete activity (marking circles with left and right hands independently); discuss their work, both in writing and verbally; and then progress to more abstract representations, including graphs. The students will conduct a simple experiment to determine how quickly they are able to cross out circles with their right hands compared to their left hands in a given time. They will graph the results, interpret the graph, and draw conclusions about their hand preference.

PROCEDURE

1. Hand out Activity Sheet 1 and instruct the students to wait to begin until you start a timer. Using their left hand, have them mark as many circles as possible within the given time (15 seconds or so, depending on age level), stopping when the time is up. Restart the timer and have students mark, with their right hand this time, as many circles as possible within the same given time. If the students are working in pairs, the same student should do the marking each time.
2. Have students count the number of marks in each column and write those numbers in the given spaces at the bottom of the Activity Sheet.
3. Hand out Activity Sheet 2: Recording and Graphing the Data. Gather the data from each group, modeling how to fill out the table. Then discuss the results.
4. Have students use the graph provided on the second half of the Activity Sheet and graph the line $y = x$. Then have them graph the class data, coming to an agreement on the scale used on the axes. Discuss results.
5. Hand out Activity Sheet 3: Experiment Questions. Have the students answer the questions: independently, in pairs, or in small groups.
6. Have students share and discuss their answers to the questions as a whole class.

Student Activity Sheets, pages 39–41 . . .

Lefty-Righty Experiment Activity Sheet 1

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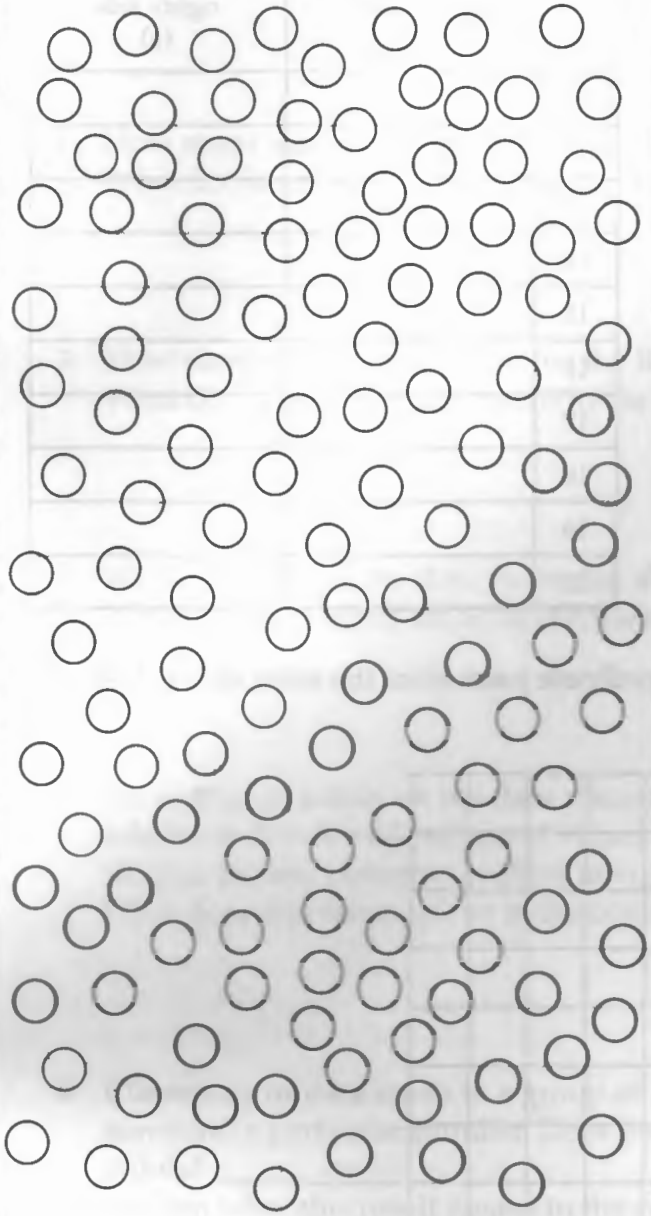
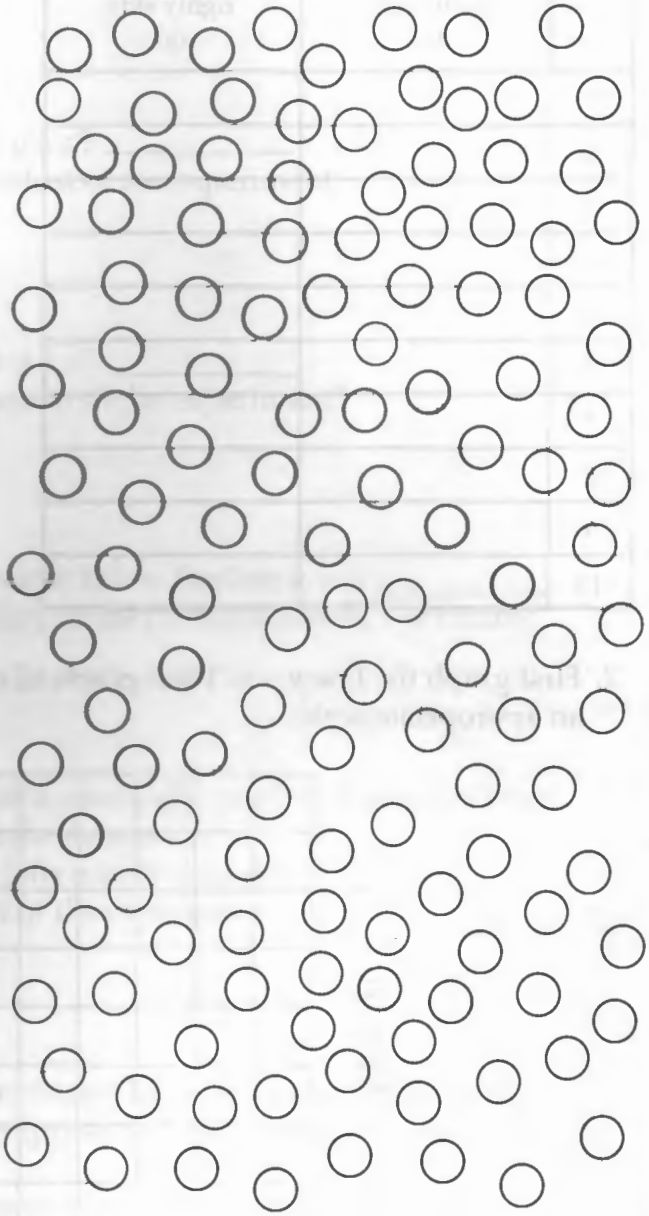
1. Use your *left hand* to write as many Xs as you can inside the circles. Wait for your teacher's signal to start. Stop when your teacher says time is over.



2. Use your *right hand* to write as many Xs as you can inside the circles. Wait for your teacher's signal to start. Stop when your teacher says time is over.



3. Count the number of circles that have an X on your *lefty* side. _____

4. Count the number of circles that have an X on your *righty* side. _____

Lefty-Righty Experiment Activity Sheet 2

Recording and Graphing the Data

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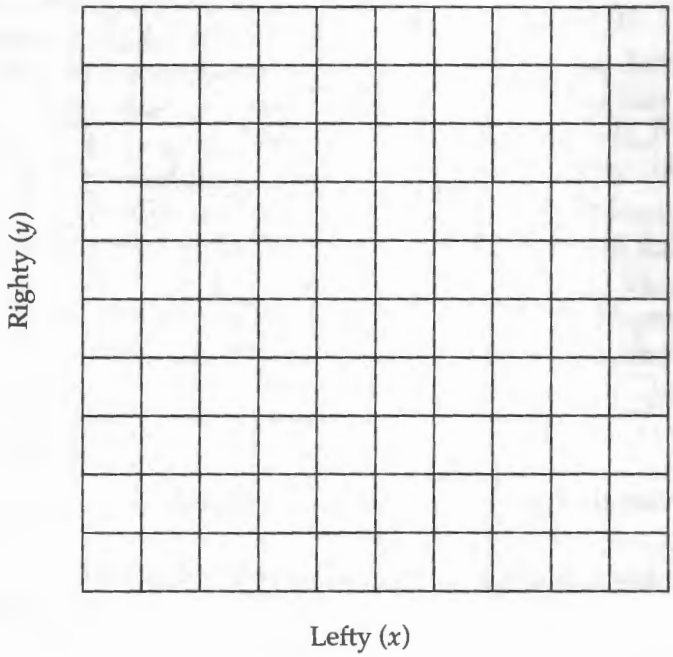
1. Record the class data in the table below.

	Number of circles with x's on the lefty side (x)	Number of circles with x's on the righty side (y)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

	Number of circles with x's on the lefty side (x)	Number of circles with x's on the righty side (y)
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

2. First graph the line $y = x$. Then graph all coordinate pairs from the table above. Use an appropriate scale.



Lefty-Righty Experiment Activity Sheet 3
Experiment Questions

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1. How many data points are on the line $y = x$? _____
   What do these data points mean in the context of the experiment?

2. How many data points are above the line $y = x$? _____
   What do these data points mean in the context of the experiment?

3. How many data points are below the line $y = x$? _____
   What do these data points mean in the context of the experiment?

4. Where do most of the data points lie: above or below the line $y = x$? _____
   What does this result tell us about the ability of the class to cross off the circles?

5. An **outlier** of a data set is a data value that is unusually small or unusually large relative to the overall pattern of values in the data set.
   Do you see any potential outliers in your lefty-righty data set? _____
   What does this result tell us in the context of the experiment?

6. **Clustering of data** refers to a group of numbers where members of each group surround a particular number. Does there appear to be any clustering of the data points? _____
   Explain what this result means in the context of the experiment.